Tulsiramji Gaikwad-Patil College of Engineering and Technology
Wardha Road, Nagpur-441 108
NAAC Accredited (A+ Grade) & NBA Accredited
An Autonomous Institute affiliated to RTMNU Nagpur

Second Year (Semester-III) B.Tech. Electronics & Communication Engineering

BEC32321: INTEGRATED CIRCUITS AND APPLICATIONS

Teaching Scheme	
Lectures	3 Hrs/week
Tutorial	- Hrs/week
Total Credit	3

Examination Scheme	
CT-1	**15**
CT-2	**15**
TA	**10**
ESE	**60**
Total	**100**

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Course Outcomes (CO)

Students will be able to

Explain the characteristics and modes of operation of ideal and practical operational amplifiers.
Illustrate the working of sine wave oscillators such as RC phase shift and Wien bridge oscillators.
Apply op-amps and 555 timers in the design of waveform generators and timing circuits in monostable and astable modes
Implement CMOS inverter principles to construct basic combinational and sequential CMOS logic circuits
Demonstrate the concepts of ADC types (Flash, Counter, Successive Approximation, Dual Slope) through practical data conversion problem

Course Contents

Unit I	Integrated circuits basics, Operational Amplifiers: Introduction to ideal and practical Op. amps, Characteristics, Modes of operation. Applications of Op. amp: Adder, Subtractor, Integrator, Differentiator, Instrumentation amplifier.
Unit II	Problem Solving: Problems based on applications of Op. amp. Active filters: Lowpass, Highpass, Bandpass and Band reject filters. Sinewave Oscillators: RC phase shift, Wien bridge Oscillators
Unit III	Non-linear applications of Op. amp: Comparators, Zero crossing detectors and Schmitt trigger, waveform generator. 555 Timer: Operation, Monostable and Astable modes
Unit IV	IC 565 PLL: Operation and applications, IC 78xx/79xx Voltage regulators: Features, three terminal voltage regulators, CMOS inverter, CMOS combinational and sequential circuits
Unit V	Digital to Analog Converters: Weighted resistor DAC and R-2R ladder DAC, Analog to Digital Converters: Flash type, counter type, successive approximation type and dual slope integrating type

Text Books

1	Operational Amplifier and Linear Integrated Circuits by Kumar D. Mahesh published by MC Millan Iindia Ltd
2	Operational Amplifiers and Linear IC's by Bell ,David A. published by Oxford University Press. Edition 3
3	Operational Amplifiers and their Applications by Sarkar.S, published by S. CHAND and CO, Edition 1.

Reference Books	
1	Operational Amplifiers and Linear Integrated Circuits by Coughlin Robert F Driscoll Fredrick F. published by PEARSON EDUCATION, Edition 6.
2	Design with Operational Amplifiers & Analog Integrated Circuits by FRANCO, SERGIO published by TATA MCGRAW HILL, Edition 5.
Useful Links	
1	https://nptel.ac.in/courses/108108111
2	https://nptel.ac.in/courses/108103378